This is the accepted manuscript of the article, which has been published in Journal of Couple and Relationship Therapy. 2019, 18(3), 189-222. https://doi.org/10.1080/15332691.2018.1551166

Alliance Formations in Couple Therapy – a Multi-Modal and Multi-Method Study

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Accepted for publication in Journal of Couple and Relationship Therapy 17.11.2018

(Decision given by Editor-in-Chief Dr. Katherine Hertlein, katherine.hertlein@unlv.edu)

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Acknowledgements

We thank Petri Kinnunen and Lauri Viljanto for assisting in technical issues related to the study design.

Author Contributions

VLK: designed and executed the study, analyzed the data (SRI, measures, integration of the modalities), and wrote the paper. AT: designed and executed the study, analyzed the data (psychophysiological measures), and collaborated in writing of the paper. PNS: analyzed the data (bodily mirroring) and collaborated in writing of the paper. KK: analyzed the data (conversational exchange), and collaborated in writing of the paper. JW: analyzed the data (conversational exchange), and collaborated in writing of the paper. JK: designed the study and collaborated in writing of the final manuscript. MP: designed the study and collaborated in writing of the final manuscript. JS: designed the study and collaborated in writing of the final manuscript.

Funding

This study was funded by the Academy of Finland (Grant number 265492).

Compliance with Ethical Standards

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee of University of Jyvaskyla and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Conflict of Interest

The authors declare that they have no conflict of interests.

Alliance Formations in Couple Therapy – a Multi-Modal and Multi-Method Study

Abstract

Objectives: To study underlying processes of alliance formation, a multi-method and multi-modal research procedure was developed and applied to a six-minute episode from one couple therapy case. **Method:** The participants were a couple and two male co-therapists. The interaction was analyzed at the levels of the conversational exchange, bodily postures and movements, and Autonomic Nervous System responses. Data were also obtained from Stimulated Recall Interviews and an alliance measure. **Results:** When there were clear markers of alliance in a dyad's conversation, markers of nonverbal synchrony (such as posture or movement mirroring, or sympathetic nervous system synchrony), were also observed in one or several modalities. Moreover, markers of nonverbal synchrony were often observed, not only between those who participated actively on the conversational level, but also between listeners. These markers of nonverbal alliance served important balancing functions by providing support, and maintaining the connection to a client. **Conclusion:** Even more than previously assumed, implicit nonverbal attunement between clients and therapists may be relevant in the formation of the therapeutic alliance.

Keywords: Alliance, affiliation, attunement, bodily synchrony, couple therapy

In couple therapy, the therapeutic alliance is more complex than in dyadic settings. It involves several relationships, and is often complicated by loyalty conflicts and by violations of mutual trust between the spouses (Friedlander, Escudero, & Heatherington, 2006; Friedlander, Escudero, Heatherington, & Diamond, 2011). Symond and Horvath (2004) noted that two different kinds of relationships come into focus in couple therapy settings: the working alliance between the clients and therapist(s) on the one hand, and pre-existing trust and loyalty between the spouses on the other. The task of the therapist in couple therapy is to create an alliance both with the individuals and with the couple as a unit (Pinsof & Catherall, 1986; Watkins, 2014).

Although the alliance has been studied extensively, including in conjoint therapy contexts (e.g. Friedlander et al., 2011; Sotero, Cunha, Da Silva, Escudero, & Relvas, 2017), alliance research has applied very few multi-modal approaches that could capture the relational and embodied aspects relevant to the alliance process (Koole & Tschacher, 2016; Mellado et al., 2017). We aimed to contribute to such endeavors by focusing on the moment-to-moment interactions between the participants in one episode from one couple therapy session, during which a range of alliance formations occurred. Following Bordin's (1979) original conceptualization of the alliance, we sought to observe at different levels the underlying processes of its formation (Elvins & Green, 2008; Koole & Tschacher, 2016). We assume this to consist of both verbal and non-verbal elements, including the negotiation of agendas and positions (Gale & Newfield, 1992; Suoninen & Wahlström, 2009), and the establishment of affective and affiliative bonds (Angus & Kagan, 2007). We developed a multi-modal, multi-method research procedure to combine information from the participants' verbal and nonverbal behaviors and psychophysiological responses (as observed and measured during the therapy session), and from the participants' individual experiences of the studied interactions (as reported after the session). In this article, we seek to demonstrate the

usefulness of this research procedure in capturing implicit elements of the alliance, such as are not easily detected in the designs more often used in alliance research.

A Multi-Modal Approach to the Alliance

Social interaction occurs through a coordinated interplay of verbal and non-verbal modalities of interaction. Bodily behaviors, such as facial expressions, gaze, postures, and gestures, are involved in the overall organization of conversational turn-taking (Stivers & Sidnell, 2005; Kendon, 2004), in how interpersonal understanding is communicated (Hindmarsh et al., 2011; Mondada, 2011), and in conveying information about a person's internal states or emotions (Wallbott, 1998). For example, movements called *adaptors* (e.g. touching one's face or head with one's hands) are frequently used when a person becomes stressed or anxious (Shreve et al., 1988; Troisi, 2002).

We suggest that if the aim is to fully understand the embodied aspects of alliance processes, it is vital to consider the interplay of the modalities, even if a separate focus on each modality is needed for practical reasons. The goal and task aspects of the alliance are mainly observable in verbal interactions, while the markers of affiliation and mutual attunement (which we assume to be connected to the bond aspect of the alliance) are more observable in non-verbal than verbal interactions.

Markers of the Alliance in Conversation

The alliance can be an openly-addressed topic in a conversation, but the markers of the alliance can also be less straightforward. We suggest that collaboration in conversations, as expressed in alignments and shared agendas, is connected to the goal and task aspects of the alliance. This can be observed in the extent to which clients and therapists share goals and how "enthusiastically" they engage in the therapeutic activities (Muntigl & Horvath, 2016). Participants pursue various agendas (Gale & Newfield, 1992), offering different topics to be

talked about, and introducing issues to which the conversation should be oriented. Collaboration is structurally realized as *alignment*, which commonly involves accepting and following conversational sequences or interactional roles. It is emotionally realized as *affiliation*, as when empathy is displayed, or the stance of another interlocutor endorsed (Steensig, 2013). Means of reducing conversational collaboration also exist, taking the form of *misalignment*, as when one does not take up a preferred conversational position, and *disaffiliation*, as when one does not respond to the emotional state displayed by another.

Affiliation, the "affective level of co-operation" (Stivers, Mondada, & Steensig, 2011, 21), entails bringing someone into a close connection through reciprocity, engagement, and interpersonal sensitivity (Feldman, 2012). Affiliation is displayed in conversation by showing empathy and attempts to enter a co-conversationalist's emotional expression, with support for and endorsement of his/her conveyed stance (Stivers, 2008). Such displays include the use of continuers, e.g. "mm," "yeah" (Schegloff, 1982), nods (Stivers, 2008), the use of "soft" prosody (Kykyri et al*,* 2017), and the showing of an affiliative (i.e. compassionate, caring) change in one's facial expression (Peräkylä & Ruusuvuori, 2012).

Bodily Mirroring, Affective Attunement, and Affiliative Bonds

Bodily mirroring is an important element in how affiliative bonds are formed. It encompasses preverbal affective attunement within which people become aware of and responsive to each other's experience on the bodily level (Stern, 1985; 2004; 2007). Interpersonally synchronized behaviors, such as mimicking the postures, gestures, and motor movements of others, compose a nonconscious strategy to affiliate to others (Lakin & Chartrand, 2003). Mimicking increases when a person wants to affiliate with others, and when there is a formal or informal goal to build a relationship (Chartrand & Bargh, 1999; Chartrand & van Baaren, 2009). People who mimic each other become more attuned to each other affectively than those who do not participate in mimicking (Stel & Vonk, 2010). Mimicry seems to be a way

of understanding other persons' emotions (Stel & van den Bos, 2010). It relates to empathic behavior (Maurer & Tindall, 1983; Sonnby-Borgström, 2002), and to the sharing of similar views (Scheflen, 1964).

Preverbal attunement is closely related to emotional contagion, involving very rapid, automatic, and unconscious resonance with others' feelings by "catching" these and sensing them in one's own body (Hatfield, Cacioppo, & Rapson, 1994; Hatfield, Rapson, & Le, 2011). It carries relational information, since it allows interlocutors to "feel for" what others experience (Fishbane, 2001; 2007). It has been suggested that processes of emotional contagion and preverbal attunement between therapists and clients are mediated through nonverbal behaviors (Koole & Tschacher, 2016), and it has been shown that synchronized movement within client-therapist dyads relates to both the relationship quality and the outcome of the therapy (Ramseyer & Tschacher, 2011). A therapist who mirrors the client's postures and movements displays empathy and bodily attunement with the client, and during this kind of mimicking, the client and the therapist may feel connected to each other (Raingruber, 2001; Trout & Rosenfeld, 1980; Sharpley, Halat, Rabinowicz, Weiland & Stafford, 2001). On the basis of this, we here focus on markers of the non-verbal alliance, as expressed via similar postures and gestures between participants.

Physiological Synchronization as a Marker of the Alliance

Changes in the synchronization of physiological responses between therapy participants can be related to the therapeutic alliance (Karvonen, 2017). Clients have reported feeling more empathy from their therapist when they share similar physiological states (Marci et al., 2007; Messina et al., 2013). The lack of a physiological connection, for its part, may relate to a poorer alliance. Reactions in the ANS are usually invisible to the naked eye, but are sometimes visible as signs of agitation (e.g. blushing) or as relaxation. Recording ANS activity allows the detection of strong bodily reactions that could be missed by merely

observing the participants' behavior; moreover, it can indicate what is important and meaningful for the participants in the discussion.

The sympathetic nervous system (SNS) prepares the body for action, and its activity is often measured by recording electrodermal activity (EDA) via skin conductance (SC). SC reflects the arousal level of participants, and it increases in most emotional reactions (Kreibig, 2010). The level of SC is also linked to defensive strategies; thus, it shows signs of increase if thoughts are suppressed, or if emotional expressions are inhibited (Hughes, Uhlmann, & Pennebaker, 1994).

While SC activity is largely below the level of consciousness, breathing can to some extent be modified by conscious effort. Different breathing rhythms have been related to basic emotions (Bloch, Lemeignan, & Aguilera-T, 1991), and holding one's breath has been shown to be an indicator of anxiety (Wilhelm, Pfaltz, Grossman, & Walton, 2006).

Levenson and Gottman (1983; 1985) suggested that married couples have higher SC synchrony when they discuss conflicts as opposed to neutral topics. However, most studies on physiological synchrony in couples have been conducted in relation to conflict tasks, possibly eliciting specific types of stress-related processes (Timmons et al., 2015). In recording SC and breathing during multi-person therapy situations (Karvonen et al, 2016), it was found that in the second session of couple therapy, the spouses showed the lowest SC synchrony, whereas the co-therapists showed the highest synchrony.

Individual Experience of the Session Interactions

The participants' individual experiences of in-session interactions can provide useful information when one is interpreting possible alliance markers within the session. As researchers, we had access to (some of) the clients' and therapists' private thoughts and feelings regarding the session, as these were reported within individual video-assisted Stimulated Recall Interviews (SRIs) (Kagan, Krathwohl, & Miller, 1963), conducted after the

session. Moreover, both the clients' and the therapists' ratings of the alliance were available for the session in question. SRIs are informative in terms of learning about the individual interests and agendas of participants which may not have been openly expressed during the session. They may reveal important information on the participants' experiences of emotionally tensioned moments, plus how they experienced the affective interactions that occurred. Note that the increased arousal observed in the participants' ANS may be caused by factors other than emotions; hence, the valence of the possible emotions cannot be evaluated by ANS responses alone. Note also that without interviews, certain in-session experiences may not be accessible, since the participants themselves may not have appreciated them fully within the situation. When a video is shown, the actualized emotions themselves often facilitate recall.

Aims and Research Questions

The aims of the study were (i) to explore underlying processes of alliance formation in couple therapy, on several levels and in several modalities, and (ii) to develop a research procedure for detailed multi-method analysis of these. The starting point for our study was an observation that in the therapy session focused on here, in contrast to findings from other comparable cases (Karvonen et al, 2016: Tourunen et al, in press), the co-therapists had low synchrony in their electrodermal activity. The therapists' individual SRIs revealed that the therapists had in fact had different therapeutic agendas during one emotionally loaded 6-minute episode within the session. The session and this episode were considered to be potentially informative regarding the multi-level underlying processes of alliance formations.

In the detailed analysis of the selected episode, the aim was to explore the following: (i) how different affiliations and agendas between participants were (or were not) observable in (a) verbal interactions, (b) body postures and movements, (c) autonomic nervous system activity (electrodermal activity and respiration);

(ii) the kinds of variations observable in how the participants emotionally attuned to others (a) interpersonally, and (b) cross-modally;

(iii) the nature of the temporal organization over the session of the *intra*personal responses (occurring within a given participant) and the *inter*personal synchronies/attunements (occurring between two or more participants), within different modalities;

(iv) how the participants' individual experiences were related to observable behaviors and physiological responses.

Method

Data

The data for this study were drawn from the Relational mind research project (Seikkula et al. 2015; 2018), and were obtained at the University of Jyväskylä, Psychotherapy Research and Training Centre. The aim of the project was to shed light on attunement and synchrony in a multi-actor couple therapy setting, considering various levels, and giving attention to the interaction (both verbal and non-verbal) and the ANS responses. The couple therapy was non-manualized, and the two male co-therapists (both of whom were experienced couple and family therapists) mainly applied a narrative, dialogical, and reflective therapeutic approach. All the sessions were video recorded. In the second and sixth session ANS measuring and individual SRIs were conducted in accordance with the research protocol of the project. Progress in the therapy was monitored by the Outcome Rating Scale (ORS), given to both clients before each session, and by the Session Rating Scale (SRS) (Miller & Duncan, 2004), given to the clients and the therapists after each session individually.

The data for this study came from Session 2. The session was video recorded using four cameras which captured a precise facial image of each participant. In addition, there were two cameras covering the whole bodies of the participants. Both the clients and the therapists

wore equipment for ANS recordings during the therapy session and the SRIs. Four extracts from the session were selected by one researcher for showing in the SRIs, based on the following criteria: (i) visible emotional expression (weeping); (ii) a notable change in the interaction (e.g. lively dialogue after a silence, or after a long monologue); (iii) visible synchrony in ANS measurements (respiration, SC) between two or more participants. The SRIs were conducted within one day from the therapy session, and were recorded with two cameras.

The participants gave their informed written consent to the use of the data. The Ethical Committee of University of Jyväskylä had approved the research.

The Case

Heli (female client) and Lasse (male client) (both names pseudonyms), a married couple with children, were referred to couple therapy by the therapist of a treatment group for men who had been violent towards their spouses. Lasse had entered the group after an incident in which he behaved violently towards Heli. Thereafter, he had committed himself to nonviolence. The other reasons for referral were problems of loyalty and mutual trust between the spouses. During the period of the couple therapy process (10 sessions altogether), the couple did not report any occurrence of violence between the spouses.

ANS Measurements

SC was recorded from the clients and therapists using two disposable electrodes (Ag/AgCl, Ambu® Neuroline 710, Ballerup, Denmark), placed on the palm of each participant's non-dominant hand. To record respiration, fabric belts (which stretch according to respiration cycles) were fastened around the clients' and therapists' lower chest (BrainVision BP-BM-10, Brain Products, Gilching, Germany). The participants also wore portable heart rate monitors (Firstbeat Bodyguard, Firstbeat Technologies, Jyväskylä, Finland) before the therapy session, and they continued to wear them during the session and in the personal interviews. An

amplifier (BrainProducts Brainamp ExG 16, Brain Products, Gilching, Germany) and data acquisition program (BrainVision Recorder, Brain Products, Gilching, Germany) were used to record SC and respiration with a sampling frequency of 1000 Hz. SC was determined using 0.5 V constant voltage (GSR sensor, Brain Products, Gilching, Germany). The signal was amplified in DC mode and low-pass filtered at 250 Hz. A marker unit was used to synchronize SC and respiration with the video recordings. The participants were instructed to ignore the measuring devices and to act in a natural way.

Data Selection

This study focused on the second therapy session, because (i) central topics in the couple's relationship (violence, loyalty problems) were addressed within it; (ii) the session represented an early phase of the therapy process; (iii) individual SRIs and ANS recordings were available for the session; (iv) the therapists showed low mutual SC synchrony in this session. From session 2, one 6-minute episode was selected for detailed analysis, on the basis of the following characteristics: (i) SRI data were available for this episode, within which the therapists' agendas and experiences differed from each other; (ii) there was intense visible emotional expression (weeping); (iii) a representative instance of a loyalty breach between the spouses occurred.

Analysis

A systematic, step-by-step procedure was used to analyze the participants' verbal and nonverbal behaviors and responses. The analysis was first performed separately for each modality by an expert in that modality. The analyses were conducted on both intrapersonal and interpersonal (dyads, triads, a quartet) levels, using modality-specific statistical and observational tools for detecting intrapersonal markers of alliance. The findings concerning the alliance markers from the 6-minute episode were also considered against the findings from the entire session in the same modality. After each step, the findings were discussed in

meetings with the entire research group, and in seminars which included also external experts. Finally, the findings were integrated to form a comprehensive, detailed description of the alliance formations.

Conversational exchange. The analysis of the social and discursive interaction was performed by [JW] and [KK]. In the first place, the analysis attended to how different agendas were introduced, i.e. what topics and issues were offered as relevant for the conversation, to what extent these agendas were shared or not, and by whom. Secondly, the analysis looked at the patterns of alignments between the participants, both at the structural level (i.e. who took up the conversational sequences and interactional roles suggested in some participant's turn) and the semantic level (i.e. how participants responded to the contents of the speech turns of others). Thirdly, the analysis observed displays of affiliation (emotional responsiveness) between participants. These three aspects (i.e. shared agendas, alignments, and affiliations) were considered to be markers of alliance between the participants. Along with the verbal contents, non-verbal elements – including the nods, gestures, gazes, and prosodic means involved in the coordination of the conversational sequences – were included within the analysis. The analysis proceeded through repeated separate and joint readings of the data, and through several drafts of presentations of the results. All the analyses were performed on the original Finnish transcripts of the recorded session. In this article, the English translation of the transcripts is provided in its totality, thus affording readers the possibility to appraise the trustworthiness of the analysis.

Body posture and movement mirroring. The analysis of the participants' body posture and movement mirroring (from the video) was performed by [PN-S]. Using a method created by her (Nyman-Salonen et al, submitted), all the sequences which involved mirroring movements in two categories, i.e. (i) posture mirroring (PM; two or more participants sharing a similar posture), and (ii) movement mirroring (MM; two or more participants making a

similar movement with their head, arms, torso, legs, or hands), were detected and coded using Noldus Observer XT 11.5. For PM, the frequency and duration of the mirrored postures were coded, with coding also for who (sequentially) adopted whose posture, and who disengaged from the shared posture. MM was coded if it occurred within 3 seconds. The frequencies of the mirroring were coded, as was the temporal sequence (simultaneous or consecutive). The whole session was analyzed via this method. In addition, partial PM – i.e. two or more participants having some part of their bodies (hands or legs) in similar positions – was included in the detailed analysis. All the observed PMs, MMs, and partial PMs (PPMs) were marked in the transcripts, for example ((T2 and Lasse, MM, hands)).

Autonomic nervous system. [AK] performed the analysis on SC and respiratory rate. The recorded signals were examined visually (increasing/decreasing SC, a large number of skin conductance responses (SCRs)), numerically (i.e. the highest skin conductance level (SCL) during the session), and statistically (standardized SCR peaks, SC concordance indexes), in order to detect divergence from regular states. These observations were compared to the video recordings of the therapy session. The analyses of the overall level of SC synchrony in the entire session were performed using concordance indexes (CIs), in which average slopes for 5 seconds were calculated for the differentiated signal, and Pearson's correlations were calculated for the pairs using 15 s windows with -7 s to +7 s lags (see Karvonen et al*,* 2016). A CI of above 0 would indicate that the dyad had more positive correlations than negative correlations during the entire session, whereas a CI of 0 would indicate that there were equal proportions of positive and negative correlations. The scale of the CI is ca. -1.0 to +1.00. To find each participant's moments of high arousal, the SCRs were detected using the Ledalab program (Benedek & Kaernbach, 2010). The SCRs were separated from the SCL using continuous deconvolution, and the SCR signals were standardized. Peaks

which were 2 SDs above the session average were selected as statistically significant SCRs, and they were marked with circles (Figure 2).

In the analysis of respiration, the recorded signals were visually examined, as was done previously by Itävuori et al (2015). Breath holding, or extremely shallow breathing, was of special interest, as it was easy to notice from the signal and the video. Some instances of irregular breathing, such as deeper inhalations/exhalations were also marked if they deviated markedly from the person's regular breathing pattern. Usually, these were also audible from the video. Deviations in the signals caused by the participant moving his/her hand (SC) or moving his/her torso or back in the chair (respiration) were excluded. Otherwise, the movement was noted in the analysis. Individual participants were compared to other participants, to note any apparent synchrony or de-synchrony between them. Simultaneous or almost simultaneous deviations in respiration (respiration synchrony, RS) and peaks in arousal (skin conductance synchrony, SCS) were defined as synchrony. Prominent individual and synchronized responses in SC and respiration were marked in the transcripts of the conversation, for example as ((holding breath for 5 seconds)).

Session Rating Scale. The SRS is an ultra-brief, visual analog scale depicting the working alliance, consisting of four lines. The four lines represent (i) the relationship between the clients and the therapists (feeling heard, understood, and respected), (ii) goals and topics, (iii) the therapists' approach/method, and (iv) the overall feeling concerning the session. The SRS has been found to generate reliable scores (Miller, Duncan, Sorrell & Brown, 2005), and it was used to measure the participants' individual experiences of the alliance for the entire session. An SRS score of 39–40 was defined as good, 35–38 as fair, and 34 or below as poor (Duncan & Miller, 2008).

Stimulated Recall Interviews. [V-LK] performed the video-recorded SRIs for each of the four participants. The average duration of the interviews was 48 minutes (range 41–59

minutes). The interviews were transcribed (129 pages) for the analysis, which was conducted by [V-LK]. The analysis included all the parts of the interviews in which participants commented on the overall session interaction and/or talked about the selected episode. The contents of the participants' comments, and the responses concerning their personal experiences, were analyzed. In the therapists' interviews, the analysis also focused on therapeutic hypotheses and agendas. These were used as external information concerning the therapeutic interaction studied.

Integrating the Findings from Different Levels. The final phase of the analysis aimed at detailing the role of different modalities in the formation of the alliance(s). First of all, [V-LK] performed an analysis which focused on whether (or not) the verbal, nonverbal, and physiological markers of alliance occurred simultaneously in the same dyads, and whether (or not) the individual experiences (from the interviews, and the SRSs) further confirmed the findings. The results were then discussed several times in meetings with the other authors, and were further elaborated by utilizing their expert knowledge on the theoretical foundations and methodological issues involved in measuring and interpreting the findings from the different modalities.

Results

Below, we present findings from the session as a whole concerning the various modalities. Thereafter, we provide a detailed description of the alliance formations identified in the six-minute conversational episode. At this point we address the verbal and nonverbal interactions in separate paragraphs. We then outline the participants' individual experiences of the interactions. Finally, we present the results from the integrative phase of the analysis, detailing the role of the different modalities in alliance formations.

Findings from the Session as a Whole

Conversational exchange: The participants differed from each other in their conversational activity during the session. In the 90-minute session, there were 872 verbal turns, of which Lasse performed 41%, Heli 31%, T2 14%, and T1 13%. Out of 580 minimal responses (such as "mm," "yeah," "no"), T2 performed 64%, T1 19%, Lasse 10%, and Heli 7%.

Four main themes occurred in the conversation: (i) Lasse's dependency on his family of origin, allowing his mother and sister to intrude in the couple's affairs; (ii) Lasse's sorrow and openly-displayed emotional closeness to his dead grandmother; (iii) Heli's recurrent urge to "give up" in the relationship; (iv) Lasse's violent behavior towards Heli.

Bodily mirroring: Table 1 shows all the frequencies of the PMs and MMs in the session. During the session, MM between Lasse and T2 occurred both before and during the studied 6-minute episode, but almost completely stopped after it. For her part, Heli was not active in the mirroring process. Occasionally, however, other participants mirrored her, or adopted a shared posture with her. Before the 6-minute episode, no mirroring occurred between Heli and Lasse, but in the sixth extract, Lasse adopted Heli's posture. After the episode, he mirrored her posture three times during the remainder of the session.

*** Insert Table 1 about here ***

Sympathetic nervous system synchrony: Heli and T1 formed the most highly synchronized dyad (SC CI 0.53), and Lasse and T2 the second highest (CI 0.29). The CI between T1 and T2 was 0.25, representing the lowest level of synchrony for all the therapist dyads analyzed in the overall Relational Mind study, which consisted of 12 cases (Co-therapist CI $M = 0.63$). The CIs for the spouses, and for Heli and T2, were both 0.19, while the CI between Lasse and T1 did not differ from chance level. T1's SC was most

synchronized with Heli (T1 "followed" Heli with a lag of one second), and Lasse's SC was most synchronized with T2 (Lasse "followed" T2 with a lag of one second).

Alliance Formations Within the Specific Episode

The episode was divided into six consecutive extracts from the transcript. The transcription is here interspersed with notes on the findings from the ANS data, and from the video-recordings of the body movements and postures (in italics and within double brackets). The transcription notation is explained in Appendix 1.

The analyses of each extract consist of an interpretative description of the discursive interaction, which incorporates observations on the participants' ANS responses and ANS synchrony, and on their body movements and postures. The SCs and respiratory patterns of the participants are shown in Figure 1, and significant SCR activation in Figure 2.

*** Insert Figure 1 and Figure 2 about here ***

Extract 1 (1:08:24 – 1:08:48)

LASSE: if you like think about it (1) when we (.) Heli and I began to ((*T1 looks smilingly at Lasse, nods several times*)) (.) experience our (.) joint journey (.) it is a life-changing event ((*T2 inhales and exhales deeply*)) and one[i] should have (.) adjusted to it ((*Lasse and Heli PPM; each with hands on lap, legs placed differently))*
T1: mm ((*T1 scratches his forehead*))
LASSE: like in a different way
T1: hmm
LASSE: and acted differently so that there wouldn't have been these sorts of conflicts (3) ((*T1 smiles and keeps nodding*))
LASSE: of course losses are hard but ((*T1 stops smiling, closes his eyes*))
T1: [mm
T2: [yes
(2) ((*T1 nodding; T2 looks down*))

As a topic for the conversation, Lasse offers his shortcomings in adjusting to the requirements of the marital relationship, and presents himself as the one to be blamed for the conflicts in the relationship. There is, however, no immediate uptake of the offer on the part of any of the other participants, apart from two nonspecific minimal responses by T1. Then, after a 3-second pause, Lasse makes a connection ("losses are hard") with the earlier discussion on the loss of his grandmother, which is given as a plausible excuse for his

unsatisfactory conduct. The response of T1 to this is still vague, while T2 gives an affirmative minimal response "yes". In the extract Heli does not verbally join in the conversation. There are no prominent responses in the SC or in the breathing, and no PM or MM occur between the participants. One PPM occurs between Heli and Lasse when both have hands placed similarly on their laps.

Extract 2 (1:08:48 – 1:09:20)
LASSE: but then I should have known to rely on Heli ((*Heli looks down*))
T1: mm (.)°mm° ((*smiles*))
LASSE: rather than (1) ((*moves his head; Lasse SCR peak*)) to load those bad feelings onto Heli ((*grins; Lasse SCR peak; Heli looks at Lasse*))
T1: mm mm
T2: mh ((*nodding*))
LASSE: like this way ((*raises eyebrows, nods*))
T2: °yea°
LASSE: and well it's so easy to think in hindsight ((*laughter, smile*))
T1: mm ((*smiles*))
T2: mmm (.) mm? ((*moves his head backwards, then several nods*))
LASSE: ((*Lasse SCR peak*)) so so well
(3)
LASSE: even [though Heli ((*Lasse touches his nose))*
T1: [yes (.) but
LASSE: gave all [(.) all the help ((*Lasse and T1 MM; both lean forward simultaneously*))
T1: [mm
LASSE: [gave a lot of help then and so on
T1: [mm ((*T2 touches his nose and inhales deeply; his SC starts to rise*))
(2)

Lasse reinforces his presentation of himself as the one to blame in the relationship. He displays himself as repentant and conscious of his shortcomings, and gives credit to Heli. T2 signals a favorable uptake (nodding, "yeah"), indicating a budding alliance between him and Lasse. T1's minimal responses ("mm") are again unclear, until he shows markers of misalignment by indicating a potential disagreement ("yes, but"). Heli is still outside the verbal interaction.

Lasse has three moments of high arousal during which he is more alert than usual in the session. When he talks about how he should not have "load those bad feelings onto Heli," his SNS activation is high. First Lasse, and somewhat later T2, touch their face. This is related to

the increasing arousal, and can be seen as self-soothing behavior. The only MM occurs between Lasse and T1 as they lean forward at the same time, coinciding with turn-taking.

Extract 3 (1:09:20 – 1:09:53)

T1: yes there are of course those two sides [that in a way one knows (.) knows what one should
LASSE: [yea
T1: have done and then on the other hand one knows that one could not do it
LASSE: yea ((*nods; T2 looks down, starts touching his nose and inhaling and exhaling deeply, continued to the end of the extract*))
T1: can one (2) CAN one and should one accept ((*moves his head to right and left*)) that (1) ((*T2 SCR peak*)) in oneself ((*Heli takes a slightly deeper inhalation; Lasse starts to become moved, blinks eyes; T2 pouting his lips, touches his nose; Lasse wipes away tears, same hand and finger; MM T2 and Lasse; Lasse holds his breath/has very shallow breathing for about 11 s, looking intensely at T1*))
T1: that one has not been able to do what one wanted to (1) ((*Lasse SCR peak*)) can one (.) should one forgive oneself (.) these are difficult questions
(3)
T1: but I can see that you somehow work (.) an [awful lot with those ((*gestures with hand*))
[((*Lasse wipes tears with left hand; T2 touches his nose with right hand; MM Lasse and T2; Heli turns her head, looks at Lasse*))
T1: [questions ((*Lasse is breathing normally again*))
LASSE: [yes at least I try (.) try to so ((*Lasse SCR peak; Lasse moves his arms and departs from the partially shared posture with Heli*))

The markers of a breach in alliance between Lasse and T1 grow stronger, when T1 responds to Lasse's talk with a challenging turn. First, T1 aligns himself with Lasse's remorseful position as a person who has not been able to do what he should have done. Then he challenges Lasse's position by asking (in a rhetorical manner, using an impersonal form) whether "one" (obviously referring to Lasse) could and should accept this and whether "one" could and should forgive "oneself" for not being able to act as "one" would have preferred. Lasse responds first with two minimal responses "yes," and then starts to show markers of emotionality. T1 softens his challenge by giving credit to Lasse's efforts in working on these issues. During the extract there are no signs on T2's part of any willingness to take up T1's implicit invitation to joint reflection.

T2 starts to breathe more deeply and touch his nose, looking as if he is prepared to speak soon. His arousal level rises steeply while T1 is talking to Lasse. Lasse, on the other hand, is focused on T1, and his breathing becomes extremely shallow (or he may even be holding his breath) while T1 ponders "can one and should one accept that one has not been able to do what one wanted to." When T1 acknowledges Lasse's efforts in working with the issues, he starts to breathe normally again. MM occurs twice between T2 and Lasse, who each touch their face: T2 touches his nose, and Lasse wipes his tears away. Lasse moves away from the partially shared posture with Heli, as T1 stresses that he sees Lasse working "an awful lot" with those questions.

Extract 4 (1:09:53 – 1:10:43)

T2: [how would you (.) ((*looks down, Heli looks at T2*)) how would you know it yourself that it is automatic (1) you don't ha- ((*Lasse SCR peak*)) you don't have to think ((*gestures with hands*)) anymore and it is (.)°automatic° ((*Heli turns her head, looks at Lasse*))

LASSE: all the hard things would go as easily as this ((*T2 SCR peak; Lasse blows air, gestures with hands*)) together ((*Lasse SCR peak*))

T2: mh mh ((*nods*))

LASSE: so if (.) the other one is feeling bad so

T2: mh

LASSE: one only has only to come home ((*scratches the corner of his eye, breathes deeply and has an SCR peak*)) >so if I come home from work< ((*Lasse crosses his legs like Heli, PPM*)) (2) ((*raises eyebrows, makes a face)*) for example if (1) ((*T1 and Lasse move their torsos at the same time, MM; T1 breathes deeply and has an SCR peak*)) a glass has fallen on the floor and someone ((*T1 crosses his hands in his lap like Heli, but does not have legs crossed like Heli; PPM*)) has stepped on it and (1) Heli feels bad that it happened (.) or the children have done something or=

T2: =mm

LASSE: I haven't done something then one can see the other is feeling bad and knows immediately ((*gestures*))

T2: yes=

LASSE: =to come and help

T2: yes

LASSE: by only just (.) ((*T2 moves his head, inhales to take a turn*)) having that feeling (.) so that one shouldn't have to ask ((*T2 touches his head, inhales to take a turn*)) anything ((*Heli takes a slightly deeper breath*))

T2: °yes (.) yes° ((*T2 moves his head, inhales to take a turn*))

LASSE: so that it would all come automatically then

T2 makes a topical shift in the conversation, as an effort to engage Lasse in a different agenda from the one in Extract 3 (E3). He picks up a thread from an earlier sequence in the

conversation (not shown in the extracts), in which Lasse had formulated as a goal for the couple that the conflicts would be solved "automatically." T2 frames a future-directed reflective question, which works as an invitation to change the focus of the conversation from the past towards the future, and to identify concrete possible markers of preferred change. The shift of focus would be from Lasse's past failures to what can be done in the couple's and family's present interaction. Lasse responds by giving an account of a hypothetical situation. This is interspersed by T2's apparently validating minimal response ("yes"). He does not, however, follow up on Lasse's account. Neither T1 nor Heli take part in the verbal exchange.

Lasse continues to have moments of high physiological arousal, being very alert while listening to T2's question, and answering it. In some instances, the deep breaths taken by the participants (especially Lasse and T1) are likely to influence the SCR peaks. At the end of the extract, T2 takes several inhalations in order to take a turn. There is MM between T1 and Lasse, who lean forward at the same time; this is not now connected with overlapping turns. T1 has an SCR peak. T1 places his hands so they are crossed in his lap, partially mirroring Heli's posture (PPM; hands, not legs). Lasse partially mirrors Heli's posture when he gives an everyday example of a need to respond to Heli's bad feelings.

Extract 5 (1:10:43 – 1:12:03)

((*throughout the extract, T1's SC is decreasing while T2's SC increases*))
T2: yeah m-may I ask ((*gesturing with his hand, Heli looks at T2; Lasse holds his breath/has shallow breathing for 5 s, looking intensely at T2*))
T2: now when (.) we were talking about your grandmother (.) and about her (.) death ((*gesturing*)) (.) what what kind of (.) thoughts came into your mind
(2) ((*T2 takes a deeper breath, Lasse starts to breathe normally again; Heli looks at Lasse, with a sad and compassionate expression on her face*))
LASSE: longing? ((*starts to cry, moves his head; T2 puts his hands on his lap like Lasse, but does not cross his legs, PPM*))
(4) ((*Lasse wipes tears from his cheek, T1 nods*))
T2: mh
LASSE: it hasn't come for a long time but now it came ((*wiping tears, tearful voice*))
(1)
T2: mh ((*nodding, looking down*))
(2) ((*Lasse weeps*))
T2: .hh ((*pointing up with his hand*)) if (.) your grandmother (.) heard our (.)

((*Lasse wipes tears, Heli looks at T2 and then again at Lasse*)) conversation (.) that we have been having here °what would she say° ((*with soft voice*)) (2) ((*Lasse shakes his head*)) if she had been here with us and (1) ((*T2 SCR peak*)) °listened to us so° (1) ((*Lasse holds his breath/has shallow breathing for 4 s*))

LASSE: °I cannot say° ((*shaking his head, weeping*))

T2: mm
(3)

T2: °would she have some advice (.) ((*gesturing with his hand; Lasse wipes tears*))

T2: to give (.) then° ((*Lasse shakes his head, changes the posture of his arms and thus departs from shared posture with T2*))
(3) ((*T2 holds his breath/has shallow breathing for 7 s*))

LASSE: yes surely only that (.) everything's gonna work out (1) ((*taps his leg with his hand and puts his hand like T2, PPM*))

T2: ((*nodding*)) .hh

LASSE: it has worked out before too (.) ((*taps his leg with his hand*))

T2: she says that everything's gonna work out ((*taps his leg with his hand, MM*))

LASSE: yes (.)

T2: that it has worked out before too

LASSE: yes (.) when times have been hard ((*with tearful voice; T2 moves away from the partially shared posture with Lasse*))

T2: mh ((*moves his head backwards*))
(1)

T2: everything works out as it has worked out before ((*gesturing with his hand*)) too=
((*T2 places his hands on his lap like Heli and T1, PPM; T1 and T2 PM*))

LASSE: =yes=

T2: =when the times have been hard
(4)

T2: how would you answer her (.) ((*Heli looks at T2 and again at Lasse*; *Heli SCR peak*)) if she °were here saying° ((*Lasse's highest SCL of the whole session; the decreasing trend in T1's SC ends*))
(6)

LASSE: ((*leaning towards Heli, raising his left hand, wiping tears*)) probably not anything else than hug her ((*Lasse SCR peak; holds his breath/has shallow breathing for 7 s*))

T2: mh (.) mh ((nodding)) (2) yes ((*moves his head backwards, lifting his chin; Heli looks down*))
(3)

T2: yes

T2 leaves the agenda introduced in E4 and returns to the topic presented by Lasse in E1. The alliance markers between T2 and Lasse grow stronger, while T1 and Heli are outside the verbal exchange. T2 mentions the earlier conversation about Lasse's loss and asks what thoughts came into Lasse's mind when he was talking about his grandmother and her death. Lasse responds, not by disclosing his thoughts, but by naming and expressing an emotional state, his "longing." T2 shows affiliation to Lasse's weeping by nodding and using soft

prosody. Although Heli does not take a turn, she looks compassionately at Lasse. When T2 reformulates his question ("would she have some advice") Lasse's response is passive; the grandmother's message would be a reassurance, not advice for action. T2 responds to this by repeating Lasse's words, and then asks how Lasse would answer his grandmother. Lasse does not formulate an answer, but says that he would hug her.

Lasse has several moments during which he is holding his breath or has very shallow breathing. On one occasion, Lasse starts to breathe normally again after T2 has taken a deep breath, and on another occasion, T2 also joins with Lasse by holding his breath. T2's arousal increases to a high level when he asks Lasse what his late grandmother would say to him if she were here. Surprisingly, it is Heli who first becomes very alert when T2 then asks Lasse what he would reply to the grandmother. In moving to a response, Lasse's SNS activity, too, rises to a high level. His breathing is disrupted in the stretch when he is silent and finally answers that he would just hug her. T1's SC has been decreasing, but at this intense moment the decrease stops.

T2 places his arms on his lap similarly to Lasse when Lasse starts to cry. When T2 asks Lasse if his grandmother would have any advice to give him, Lasse moves his arms, thus breaking the partially shared posture with T2. After that, MM (tapping a leg with the hand) occurs between Lasse and T2, and Lasse again partially adopts the same posture as T2 (PPM). While Lasse continues to answer, T2 moves away from the partially shared posture and puts his hands on his lap, similarly to Heli and T1. Now T1 and T2 have exactly the same posture.

Extract 6 (1:12:03 – 1:13:43)

T1: Heli what is going on in your mind ((*T1 nods; Heli turns her head, looks at T1; Heli SCR peak; Lasse is breathing normally again*)) while you've been listening (.) to Lasse's (.) ((*T2 SCR peak*)) talk (.) ((*Lasse wipes tears, has an SCR peak*)) his words

HELI: yea? (4) ((*Heli turns her head, looks at Lasse, then looks down; Heli SCR peak*)) °hard to say° you do kind of wish that somehow (3) ((*Lasse wipes his eyes; T2 moves his arms and no longer has his hands on his lap like Heli and T1; T1's SC continues to decrease*)) somehow that ((*Lasse and Heli mutual gaze*)) (1) well I can't say I was thinking that (1) Lasse is after all like (.) a grown-up (.) man and a father (.) ((*Lasse's SC increases*)) even though his (.) his his (1) kind of what which ((*Heli moves her*

arms away from her lap and the partially shared posture with T1; Lasse wipes tears below his eye)) fam- ((*Heli changes posture and Lasse mirrors her torso movement ((MM))* what family ((*Heli and Lasse mutual gaze*)) is it then (.) ((*Lasse looks behind, for tissues?*)) the childhood family ((*Lasse SCR peak*)) or that so ((*Heli SCR peak; Lasse touches his cheek; T2 looks behind, for tissues?; MM Lasse and T2; Lasse sniffs*))

T2: yes

HELI: that even ((*Heli and Lasse mutual gaze*)) though it has a large role ((*Lasse holds his breath/has shallow breathing for 8 s*)) and is important (1) ((*T2 SCR peak; Lasse touches his nose; Heli's SC remains very high for the rest of the extract*)) so that somehow he could see ((*Heli and Lasse mutual gaze*)) that (.) ((*Lasse SCR peak*)) like his life is after all like at the moment ((*Heli and Lasse mutual gaze, Lasse is breathing normally again*)) (.) with us we are like the nuclear family ((*Lasse takes Heli's posture*))

T2: mm ((*nods*))

HELI: somehow (.) like (.) I was thinking like .hh just that like (2) even though (.) no matter what Lasse has done ((*T2 takes deep inhalations and breathes out*))

HELI: I have always like been on your side somehow (.) ((*Heli and Lasse mutual gaze*))

LASSE: you have= ((*nods*))

HELI: =except for that violence= ((*Lasse and Heli nodding, looking at each other*))

LASSE: =yeah=

HELI: = that I like don't accept (.) ((*Heli SCR peak*)) in any (.) in any case in any way (.) or then my family (.) how many times they could have (.) criticized you ((*Heli SCR peak*)) but (.)

LASSE: °mm°

HELI: probably they have never said a word that

LASSE: [°no° ((*shakes his head*))

HELI: [he wouldn't be (.) welcome in the family (.) or (-) to that (.) ((*T2 SCR peak*)) whatever family that is (.) ((*Heli SCR peak*)) [to that extended family ((*T1 and T2 move simultaneously changing posture, MM; T2 inhaling to take a turn*))

LASSE: [yea

HELI: so somehow that (.) we could

T2: ((*T2 SCR peak*)) [yes

HELI: [that it would be like that on both sides (.) that I'd be welcomed in the same way

T2: yes

Showing an effort to build an alliance with Heli, T1 invites her into the conversation by asking her what has been going on in her mind during Lasse's talk. T1 starts pursuing a different therapeutic agenda from that followed by T2 in E5. After some hesitation, Heli makes a strong bid for considering Lasse's present position as "a grown-up man and a father" who, "even though his childhood family has a large role and is important," should accept his obligation to his present family. Heli justifies her right to present a demand and to blame Lasse, by testifying to her own and her family's acceptance of him and to the support given to

him, except with regard to his violence towards her. Lasse does not defend himself in any way, and accepts Heli's claim that she and her family have always supported Lasse.

Heli becomes physiologically alert when T1 addresses her, after the focus has been on Lasse for some time. Lasse and T2 share a high level of arousal at this point. Heli has increased SCR activity while she tries to describe what is going on in her mind. When Heli mentions Lasse's childhood family, they both have very high arousal. Lasse's breathing is shallow when Heli describes Lasse's childhood family as having a large role, and T2's arousal level is also high at this point. When Heli says that she does not accept violence, and that her family has not criticized Lasse, she is physiologically in a high state of arousal. At the end of the extract, T2 starts to prepare for action by having high physiological arousal and by taking an inhalation in order to speak.

Mutual gaze occurs several times between Heli and Lasse. They also have their first MM of the entire session when they move simultaneously, at the moment when Heli starts to talk about her expectations of Lasse "as a grown up man and a father." There is then MM between T2 and Lasse, when Lasse looks behind and T2 follows this (opposite direction). Lasse might be looking for tissues, and T2 joins him, bodily. Lasse mirrors Heli's posture when she talks about the family formed by Lasse, Heli, and their children. When Heli talks about Lasse having always been welcomed into Heli's childhood family, both therapists change their posture simultaneously which could be interpreted as a signal of unease, or related to a topical shift (MM).

Individual Experiences from the Session

Session Rating Scale ratings: In the individual SRSs, Lasse gave a higher (40, corresponding to *good alliance*) rating than Heli (36, corresponding to *fair alliance*). The therapists' ratings (T1:34, and T2:35) were somewhat lower, and close to each other (no norms available).

Stimulated Recall Interviews: The therapy session had been an intense experience for both Lasse and Heli, who reported having felt empathy towards each other. The topics had been important, and the therapists had addressed tough questions. It had been a relief for Heli when Lasse's violent behavior was openly addressed, but Lasse had found the topic unpleasant. Heli appeared calm during her SRI, and she shared some self-reflective comments, while Lasse was emotional and wept, attributing this to the discussion of "rough issues" (i.e. the violence).

T1 had felt calm throughout the session, whilst T2 had been more emotionally involved. Both therapists reported good mutual collaboration during most of the session; nevertheless, during the chosen episode there was a difference. Both therapists had been surprised and puzzled by the intensity of Lasse's sorrow; however, the therapists' experiences of this intense emotional expression had differed from each other. While T1 had found it difficult to affiliate with Lasse's emotional expression, T2 had experienced Lasse's sorrow as touching, and had felt it deeply in his own body. Moreover, while T1 had had doubts about whether such overwhelming emotionality was constructive, T2 had considered it important for the therapeutic work, and had felt it important to secure this opportunity for Lasse to express and experience his emotions.

Integrating the Findings – Processes Underlying the Alliance Formations

The participants' conversational activity varied between the analyzed extracts. Lasse talked in all of them, and had a central role in E1 to E5. Heli talked only in E6, and her role was central in it. T1 had an active role in E3 and E6, and T2 in E4 and E5. Most conversations in the episode occurred within dyads. It was only in the sixth extract that all the participants were involved in the verbal exchange. The markers of alliance in the conversation, and also interpersonally synchronized behaviors and physiological responses, were observed mainly in dyads, and sometimes also in triads.

There were no markers of alliance, or synchronized responses and/or behaviors between the participants in E1. In E2, a dyadic alliance between T2 and Lasse started to emerge, first in conversation through T2's minimal responses, and then in movements when T2 started to mirror Lasse's movements. No markers of verbal or nonverbal alliance were observed in the other dyads. Lasse's and T1's simultaneous torso movements during their overlapping turns signaled a possible misalignment. The participants did not comment on these interactions in the interviews. In E3 to E5, the observations were mixed: on some occasions, different modalities converged, on others they differed from each other. In these extracts, there were always two participants at a given time who were actively engaged in verbal exchange (E3: T1 and Lasse; E4 and E5: T2 and Lasse), while the others participated only via minimal responses, or nonverbally, e.g. through gaze or movements.

At the point in E3 where an alliance breach between T1 and Lasse was observed, there were no markers of nonverbal or physiological synchrony in the dyad. However, it is notable that in this dyad the simultaneous torso movements at the end of E2 (during T1's overlapping "yes, but" turn with Lasse) actually indicated misalignment, nonverbally foreshadowing the breach observed in E3. In contrast, there were markers of behavioral and physiological synchrony in the two dyads who were not involved in mutual verbal interactions, namely between Lasse and Heli, and between Lasse and T2. Lasse and Heli had a similar posture, and both also exhibited deviations in their respiration patterns. When Lasse became emotional, Heli turned her head to look at Lasse, indicating possible emotional attunement between the spouses. In her SRI, Heli confirmed this: she had become emotional when she noticed Lasse's emotion. The SRIs revealed that the spouses had partially shared an understanding about what was behind their problems: both mentioned Lasse's mood problems, but while Heli highlighted the role of Lasse's childhood family, Lasse did not mention it.

Nonverbal synchrony, indicating emotional affiliation, was observed between T2 and Lasse in E3. Here, T2 mirrored Lasse's movements, and they both had high arousal peaks near to each other. The nonverbal synchrony might have served as T2's (non-conscious) support for Lasse. In his SRI, T2 confirmed that he had noticed that Lasse was moved at this moment. On the other hand, it is possible that the arousal peaks in this dyad emerged simply as a response to T1's turn: Lasse was (cognitively and emotionally) challenged by the question, and Lasse's excitement was visible also in his extremely shallow breathing at this point. It was only after T1's accepting turn ("I can see that you somehow work an awful lot with those questions") that Lasse started to breathe normally again. T2's increased alertness was probably related to being about to follow his own agenda, visible in how, at several points, T2 displayed an intention to take a turn. When he finally succeeded in this (in E4), he immediately changed the topic.

In E4 and E5, T2 and Lasse were actively engaged in mutual verbal and nonverbal interactions. Nevertheless, the alliance markers in this dyad varied during these two extracts. While both T2 and Lasse had high arousal peaks in E4, T2 did not mirror Lasse's movements as he had done in E3. It was observed that although Lasse was responding to T2's question, a possible misalignment occurred between them; thus, by moving his head sharply and taking several deep breaths during Lasse's turn, T2 indicated an intention to take a turn, which he also did at the start of E5. In his SRI, T2 confirmed a misalignment; he mentioned that he had not been totally satisfied with the conversation, since Lasse was not actually responding to what T2 had asked. T2 had also felt that the conversation lacked emotional involvement. For this reason, in order to invite more emotional activity, he had made a shift in E5 to a topic which he knew would be emotionally important to Lasse.

In E5, immediately after T2's question, Lasse started to weep. Displaying affiliation and empathy, T2 actively invited and supported Lasse in expressing and processing his emotions.

Markers of alliance and synchrony in this dyad were observed in four modalities, i.e. talk, movements, sympathetic activity, and respiration. Although it is highly likely that the changes in T2's posture and breathing patterns were non-conscious, these might have served to communicate to Lasse the message, "I am with you in this sorrow." In his SRI, T2 said that he had experienced Lasse's sorrow as deeply touching; he had sensed it in his own body, thus confirming the emotional attunement. T2 had nevertheless been surprised at the intensity of Lasse's emotional experience, which he had not anticipated. In his SRI, Lasse started to weep again while watching the video clip. Lasse said that T2's question, "what would grandmother say if she were here" was a powerful trigger, prompting him to truly burst into tears. Lasse could not recollect any other thoughts or feelings from this moment except his "longing." Lasse had been surprised and puzzled by his intense emotional expression. Towards the end of E5, T2 stopped mirroring Lasse's movements, and adopted a similar posture to T1. In his SRI, T2 mentioned that he would have preferred T1 not to be in a hurry to move forward, so that there would have been time for just "being there" with Lasse. T2 had noticed that T1's usual working style could be more active than his own in highly emotional situations such as this.

Earlier, in E4, T1 had adopted Heli's posture. This nonverbal mirroring continued throughout the emotionally intense E5, during which both T1 and Heli were silently observing the interaction between Lasse and T2. Before that, T1's sympathetic activity had been decreasing, and he had even been relaxing. During E5, this relaxing trend stopped and T1 became more activated. In his SRI, T1 said that he had felt it easier to attune emotionally with Heli than with Lasse, whose intense emotionality he had felt important, but puzzling. In her SRI, Heli said that she had felt empathy with Lasse. At the same time, she had felt it hard to understand how and why Lasse's sorrow was, after three years, still so intense that it left no room "for the living." Thus, both Heli and T1 had found it difficult to fully attune to Lasse's

sorrow. Posture mirroring between T1 and Heli served to maintain the alliance with Heli, who was outside the intense emotional interactions between Lasse and T2. This was indicated also by T1's invitation to Heli to join the conversation in E6.

In E6, after some hesitation, Heli started to criticize Lasse, who did not defend himself against her accusations. In her SRI, Heli was surprised to see how frank she had been: she would not have remembered this without seeing the video. In his SRI, T1 mentioned that Heli's comments did not surprise him. T1 had already noticed that at some point (during E5) Heli was watching Lasse's emotionality more in the manner of an "outsider." T1's question to Heli had been a conscious choice: T1 had had doubts as to whether Lasse's crying was productive, and therefore wanted to change at least the perspective, if not the topic. A working hypothesis – that Lasse's deep sorrow might be "more sadness about what was not there in the first place than sadness about what was lost" – had also started to emerge in T1's mind.

In E6, there was no verbal exchange between Lasse and T2. Despite this, markers of nonverbal alliance, including T2's mirroring of Lasse's movements, and instances of synchrony in arousal (simultaneous or almost simultaneous SCR peaks and deviations in breathing) were observed in this dyad. In his SRI, Lasse wondered why he had not been able to seek Heli's comfort in his sorrow. During the session, he had wanted to get closer to Heli by holding her hand, but had not been able to reach her because of the distance between the chairs. Although Lasse did not articulate this wish in the session, he started to mirror Heli's postures and movements when Heli mentioned the family formed by her and Lasse. This was the first time during the entire session that Lasse indicated nonverbally an attempt to join with Heli. Interestingly, T2 mentioned in his SRI that he had thought that it might be Heli whom Lasse would want to hug, not his grandmother, in order to get comfort in his misery.

In E6, Lasse and T2 responded verbally to Heli's speech with minimal responses. In the physiological responses, both T2 and Heli had EDA peaks towards the end of E6. Since Heli was criticizing Lasse, strongly insisting on her refusal to accept violence, high arousal could be expected in her. In his SRI, T2 said that he had thought that it would be good if the spouses could in some way share the emotional experience. When this did not happen, he had felt somewhat irritated. He thought that this highlighted the couple's need for therapy, and tried to think about some possible means to continue the therapeutic work.

Discussion

The embodied and constantly changing nature of the alliance formations in multi-actor settings has been an under-charted area in alliance research, due to the fact that multi-modal approaches have been rare in alliance studies. The present study addressed the gap in the literature by developing a research procedure for a detailed multi-method analysis of alliance-related interactions. The application of this procedure (to a six-minute episode representing a moment of intense emotional expression related to a loyalty breach between the spouses) made it possible to provide a rich description of the rapid moment-to-moment fluctuations in the alliance formations, and of the processes underlying these.

At the conversational level, two different therapeutic agendas emerged with respect to how to handle the intense emotionality of the interaction (Extract 5), and how to address the loyalty breach between the spouses. One therapist (T1) sought to address the issues from the perspective of the couple relationship (E3, E6), while the other (T2) oriented himself to the husband's emotional experience (E5). These differences in agendas could be observed within the conversational exchange, and were confirmed in the Stimulated Recall Interviews (SRI) conducted after the session.

Verbal and Nonverbal Markers of Alliance: Often but Not Always in Congruence

At the level of nonverbal interactions, as indicated by ANS reactions and by body postures and movements, the alliance formations changed rapidly. In most instances, the participants' conversational activity occurred in dyads or triads, meaning that one to two participants were always outside the verbal exchange. Nevertheless, the listeners' positions were not passive. Nonverbal alliance formation – i.e. posture and movement mirroring and/or physiological synchrony – was observed, not only between those who participated actively on a conversational level, but also between the listeners.

In most of these instances, when clear markers of alliance in the conversation (a shared agenda between the participants, displays of emotional affiliation) occurred within a dyad, there were also markers of nonverbal synchrony, such as posture or movement mirroring, or of sympathetic nervous system synchrony, in one or several modalities. On the other hand, when an alliance problem, such as an alliance breach, was observed within a dyad in the conversation, there were no markers of nonverbal synchrony between the two participants. The only exception to this occurred when synchronized torso movements related to turn-taking were observed in a dyad, in connection with misalignment and overlapping turns.

In some instances, physiological and/or bodily synchronies (functioning as nonverbal markers of alliance) were observed in a dyad, in the absence of any verbal alliance markers, or of any verbal exchange at all between the dyad members. When this happened within a client-therapist dyad, the nonverbal markers of alliance seemed to be related to what was happening in *another* dyad. Although sympathetic synchrony in a listening dyad could have emerged simply as a response to a shared external stimulus – such as watching an emotional interaction in another dyad (Butler, 2015) – it is also possible that nonverbal synchrony served important balancing functions in the listening dyad. Nonverbal markers of alliance could provide support to a client who was challenged by the other client, or by the co-therapist's question. Alternatively, they could maintain a connection to a client who was

outside the verbal exchange that was taking place. This finding is in line with earlier studies, which have shown that nonverbal mirroring increases when there is a goal to build a relationship (Chartrand & Bargh, 1999; Chartrand & van Baaren, 2009).

Individual SRIs revealed that when posture or movement mirroring was observed in a dyad, these participants often shared similar experiences and/or meanings. These observations are in line with earlier findings, to the effect that postural mirroring is related to empathy (Maurer & Tindall, 1983) and rapport (Trout & Rosenfeld, 1980), and that mirroring promotes an understanding of another person's emotions (Stel & van den Bos, 2010). In some instances, however, synchronized movements or arousal peaks appeared to signal disagreement rather than agreement, or else to reflect the participants' emotional reactivity and the intensity of the interaction.

The Impact of Intense Emotional Expression

During an emotionally intense moment toward the end of the E5, observations from the individual SCs indicated that everyone was attuned to the emotional interaction: there were high SCR peaks in both of the clients, and in T2. At the same time, T1's decreasing SC trend came to an end. From the SRIs, it appeared that all the participants had been surprised at the intensity of the husband's sorrow, even if the interpretations of this intense moment differed.

From the perspective of emotional co-regulation, an interesting change occurred in E5 regarding T2's breathing pattern, which seemed to take on a soothing and reassuring function. Thus, after T2's deep breath, the husband, who had been holding his breath, started to breathe normally again. He also started to share his emotional experience.

Over the entire session, the wife and T1 had the highest SC synchrony, and the husband and T2 the second highest level. There was lower SC synchrony between the therapists, and also between the couple. There was no synchrony at all between the husband and T1. In the analyzed episode, T2 did indeed show empathy towards the husband when their SCs were in

synchrony – a finding in line with previous research relating SC synchrony between the client and the therapist to clients' evaluations of empathy (Messina et al., 2013). By contrast, T1 mentioned in his interview that he had felt it easier to attune emotionally with the wife.

Did the Co-Therapists' Differing Agendas and Emotional Affiliations Underlie the Low SC Synchrony?

Over the entire session, the two therapists showed the lowest level of SC synchrony out of our dataset of twelve cases. Both therapists were equally active in conversational turns during the session, but T2 was more active in using minimal responses. This, along with the therapists' differing emotional affiliations with the clients, plus their different therapeutic agendas in the episode, could have contributed to their low mutual SC synchrony. Future research could shed light on whether SC synchrony between co-therapists reflects a similarity in the therapists' agendas or affiliations with clients. In any case, within the episode there appeared to be a tendency for the individual SCs to reflect the participants' immediate reactions to each other, rather than more enduring patterns of mutual attunement or alliance formation.

Methodological Considerations

An obvious limitation of the present study is that it was based on observations from only one conversational episode; hence, one has to be cautious in drawing broader conclusions on how verbal and nonverbal interactions contribute to alliance formation in couple therapy. Nevertheless, since it was rich with instances of verbal and nonverbal alliance formation, the episode was highly illustrative in nature, and hence exceptionally well suited to a detailed study of the processes underlying the formations in question.

In seeking to address the methodological challenges of this study, a detailed, step-by-step procedure was used. Although all the steps were equally relevant, the most important methodological contribution of this study is the integrative step of the analysis, within which findings from the different modalities were (i) compared to each other, (ii) checked against

external information from the participants' individual interviews, and (iii) checked against the alliance ratings for the entire session. It should be noted that modality-specific measures operate on different time scales, and that this needs to be considered when one is interpreting the observations. Moreover, observations from a single variable can have several meanings, and each of these may be relevant to the interaction to a greater or a lesser degree. Collaboration between experts in different modalities was important for this phase, since there was a need to interpret any such observations with caution, and in relation to the overall conversational context, as well as to the findings from other modalities.

Conclusions

Our findings indicate that verbal and nonverbal markers of alliance were often, but not always in congruence. In some instances, nonverbal synchrony preceded or even emerged independently of the verbal markers of the alliance, thus highlighting the importance of nonverbal interactions in alliance processes. Undoubtedly, studies with larger samples will be needed to further specify the roles of the different modalities in these processes. Despite this, we see this study as contributing to alliance research, demonstrating fruitful and systematic ways of conducting multi-modal, moment-to-moment analyses of the in-session interactions involved in alliance processes. Since our research procedure is time-consuming, we would see it as most useful when one is focusing on brief episodes involving important moments in therapy. These would include ruptures and repairs, moments of emotional regulation/co-regulation, or moments of either change or inability to progress (Mellado et al. 2017).

Our findings may contribute to attempts to develop a more comprehensive theory of the multi-modality of the alliance processes, and of how these processes can be observed in clinical practice. In our case, simultaneous torso movements occurred during misalignment in a client-therapist dyad, foreshadowing an alliance breach. Otherwise, a *lack* of either posture

mirroring or movement mirroring signaled an alliance breach, and changes in breathing patterns contained important information on emotional (co-)regulation. Empathy was visible as sympathetic nervous system synchrony, and in emotionally intense moments, all the participants became attuned to the situation, irrespective of their previous "trend" in nervous system activity. We suggest that clinicians could facilitate maintenance of the alliance by paying special attention to these non-verbal behaviors when they are conducting in-session monitoring of the alliance.

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Appendix 1: Transcript notation

Symbol	**Meaning**
yes (1) me too	Figures in rounded brackets represent inter- and mid-turn silences, hand-timed in seconds.
yes (.) me too	The period in rounded brackets represents "micro-pauses" of less than 0.2 seconds.
((wiping tears))	Double rounded brackets contain relevant contextual and non-verbal information added by the transcribers.
I think- I think so	A single dash following a word or letter(s) indicates an abrupt cut-off in the flow of speech (stammering).
↑ official	Upward-pointing arrows indicate rising intonation.
underlining	Underlining indicates emphasis.
[and well on the whole	Overlapping utterances are marked by single square brackets.
°and it feels bad°	A degree sign indicates significantly lower volume than in the surrounding speech.
@you get that bad feeling@	The @ symbol locates a change in the speaker's voice (for example indicating where a more gentle tone of voice begins and ends).
t(h)a(h)ke	Added h's within rounded brackets indicate laughter within the speech.
=	The "equals" sign indicates that there is no pause between the turns.

[i] (Anonymized language) uses the impersonal form (here translated as 'one') more informally than 'one' in English.